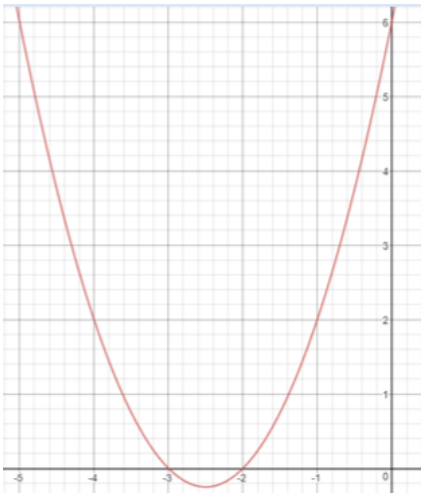
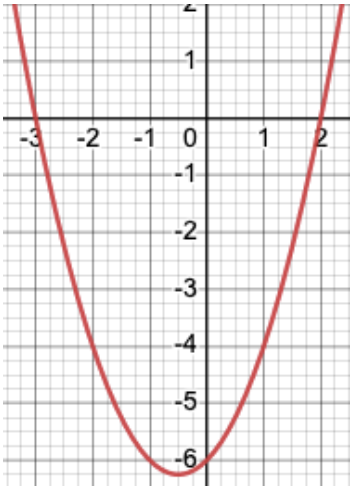
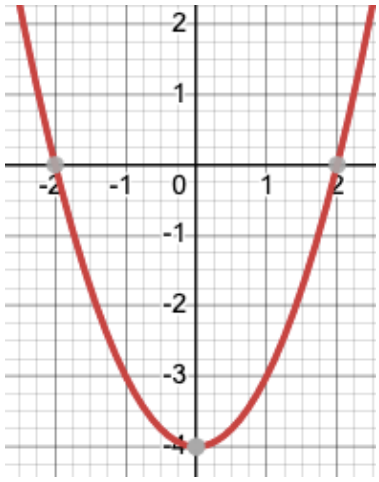
Quadratics (5) Solving Quadratics by factorising

Do now: **Factorise**

$x^2 + 5x + 6$ $(x + 5)(x + 1)$ Below is the graph of $y = x^2 + 5x + 6$  What do you notice?	$x^2 + x - 6$ $(x + 3)(x - 2)$ Below is the graph of $y = x^2 + x - 6$  What do you notice?	$x^2 - 4$ $(x + 2)(x - 2)$ Below is the graph of $y = x^2 - 4$  What do you notice?

eg $x^2 + 8x + 15 = 0$

eg $x^2 - 5x - 14 = 0$

eg $x^2 + 10x + 25 = 0$

eg $(x+1)^2 = 2x + 10$

Level 1 – positive and negative coefficients

1. $x^2+10x+21=0$ $\Rightarrow (x+7)(x+3)=0$ $\Rightarrow x=-7,-3$	4. $x^2-x-20=0$ $\Rightarrow (x+4)(x-5)=0$ $\Rightarrow x=-4,5$	7. $x^2+5x-14=0$ $\Rightarrow (x+7)(x-2)=0$ $\Rightarrow x=-7,2$
2. $x^2+2x-8=0$ $\Rightarrow (x+4)(x-2)=0$ $\Rightarrow x=-4,2$	5. $x^2+14x+40=0$ $\Rightarrow (x+10)(x+4)=0$ $\Rightarrow x=-10,-4$	8. $x^2-x-12=0$ $\Rightarrow (x+3)(x-4)=0$ $\Rightarrow x=-3,4$
3. $x^2-6x-27=0$ $\Rightarrow (x+3)(x-9)=0$ $\Rightarrow x=-3,9$	6. $x^2-8x+15=0$ $\Rightarrow (x-3)(x-5)=0$ $\Rightarrow x=3,5$	9. $x^2-13x+40=0$ $\Rightarrow (x-5)(x-8)=0$ $\Rightarrow x=5,8$

Level 2 – perfect squares or difference of squares

1. $x^2+6x+9=0$ $\Rightarrow (x+3)^2=0$ $\Rightarrow x=-3$	4. $x^2-49=0$ $\Rightarrow (x+7)(x-7)=0$ $\Rightarrow x=-7,7$	7. $x^2-x+\frac{1}{4}=0$ $\Rightarrow (x-\frac{1}{2})^2=0$ $\Rightarrow x=\frac{1}{2}$
2. $x^2-16=0$ $\Rightarrow (x+4)(x-4)=0$ $\Rightarrow x=-4,4$	5. $x^2-20x+100=0$ $\Rightarrow (x-10)^2=0$ $\Rightarrow x=10$	8. $x^2-13=0$ $\Rightarrow (x+\sqrt{13})(x-\sqrt{13})=0$ $\Rightarrow x=-\sqrt{13},\sqrt{13}$
3. $x^2-10x+25=0$ $\Rightarrow (x-5)^2=0$ $\Rightarrow x=5$	6. $x^2+2x+1=0$ $\Rightarrow (x+1)^2=0$ $\Rightarrow x=-1$	9. $x^2+4=0$ no solution!

Level 3 – rearrangement required

1. $x^2+2x=3$	4. $x^2-17x=-30$	7. $3x^2+9x+15=9$
2. $x^2+10=7x$	5. $2x^2-8x+8=0$	8. $(x+3)^2=4$
3. $x^2-4x=45$	6. $5x^2+10=15x$	9. $x(x-6)=9-6x$

Level 4 – the coefficient of x^2 does not equal 1

$x^2-9x+20=0$ $(x-4)(x-5)=0$ $x-4=0$ $\quad$ $x-5=0$ $x=4$ $\quad$ $x=5$	$x^2-5x-6=0$ $(x-6)(x+1)=0$ $x-6=0$ $\quad$ $x+1=0$ $x=6$ $\quad$ $x=-1$	$6x^2-5x-6=0$ $(2x-3)(3x-2)=0$ $2x-3=0$ $\quad$ $3x-2=0$ $x=\frac{3}{2}$ $\quad$ $x=\frac{2}{3}$
$x^2=4x$ $x(x+4)=0$ $x=-4, x=0$	$4x^2-16x+15=0$ $(2x-3)(2x-5)=0$ $2x-3=0$ $\quad$ $2x-5=0$ $x=\frac{3}{2}$ $\quad$ $x=\frac{5}{2}$	$(x+3)^2=x+5$ $x^2+6x+9=x+5$ $x^2+5x+4=0$ $(x+4)(x+1)=0$ $X=-4, x=-1$